

# **Ecosystem Modeling: Looking for Common Themes Group 3 Ideas**



US Army Corps  
of Engineers

Engineer Research & Development Center

# Approach

- Not convinced we know enough about eco similitude to lay out unifying principles that point the way
- Not convinced that a single framework will address the widely varying issues
- Took the approach of laying out “what we presently can’t do or are not doing that we should possibly be doing”



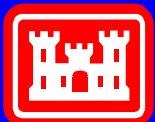
# Things we presently can not do or are not doing and possibly should be doing

- Landscape evolution modeling with linkages to desktop and high fidelity models for hydro, WQ, sediment, habitat classification/value, etc. (ex. Everglades landscape model, CELS, CLEAR, EDYS)
- Parameterization of population trajectory models
- Coupling of IBMs/ELAMs with biogeochemistry, bioenergetics, life stages, etc.
- Conceptual and scientific linkages among different types of models, e.g., watershed and receiving water, biomass and population models, etc.



# Things we presently can not do or are not doing and possibly should be doing

- Process-based, mechanistic, predictions for higher trophic levels and TES
- Standardized geospatial framework to support eco modeling
- Quantification of uncertainty
- Application of fuzzy logic to quantify uncertainty
- Quantification of environmental benefits
- Applying methods to integrate multiple endpoint metrics into weight of evidence “best” decisions, e.g., how to role up multi-scale metrics and multiple indicators into measures of eco function



# Recommendations

- Get candidate landscape evolution models and take them around the block
- Identify and close gaps in conceptual and scientific linkages in existing key modeling areas
- Initiate next level of IBMs/ELAMS that contain life stages, linkages to env. conditions (temp, DO, etc.), and population change
- Investigate how to extend the capability to use process-based, mechanistic modeling for to predict responses of higher trophic levels and TES
- Explore integration of fuzzy logic for uncertainty analysis in eco modeling
- Standardize a geospatial framework to support eco modeling



# Recommendations

- Explore use of MCDA to integrate multiple endpoint metrics into weight of evidence “best” decisions, e.g., how to role up multi-scale metrics and multiple indicators into measures of eco function

